

Case study: Gulf of Mexico, United States

Integrated Services flawlessly drill challenging trans-salt well

A deepwater operator in the Gulf of Mexico was planning to drill out of a difficult salt formation and continue through the subsalt to total depth. The well also needed to be kicked off from vertical, adding to the complexity of drilling this section.

With other, similar projects, the operator had experienced significant nonproductive time (NPT) because of vibrations, high dogleg severity, and washing damage to the bottomhole assembly (BHA). Baker Hughes marshalled the combined expertise of its product lines to craft a precise, integrated plan that would enable the operator to drill 8,030 ft (2447.5 m) through salt while scrutinizing pore pressure subsalt in real time to predict casing depth. The plan also included the analysis of sand content and fluid properties to identify which solids were present to ensure borehole strength without damaging logging-while-drilling (LWD) tools. Baker Hughes used its X-ray diffraction analysis service to analyze the section's sand content and determined that 6% of the sand content in the fluid was halite, not silica.

Baker Hughes deployed the **AutoTrak™ G3 rotary steerable system** to provide reliable, precise steering of the BHA, the

CoPilot™ MWD system, which provided monitoring to ensure low dogleg severity, and the **SoundTrak™ acoustic LWD service**. The SoundTrak service allowed surface personnel to calibrate pre-well models, aiding in the proper placement of casing and the capture of paleontological samples.

Additionally, Baker Hughes used **Kantori™ remote service monitoring** to provide web-based visualization and analysis of real-time drilling data, and critical fluid characteristics were maintained throughout the drilling process with the use of the **RHEO-LOGIC™ constant rheology fluid system**.

The integrated solution by Baker Hughes led to a maximum ROP of 200 ft/hr (61 m/hr), which was 100% greater than expected, delivering 8,030 ft of wellbore in 87.7 hours, eliminating BHA damage and NPT, and realigning the operator with its planned timeline by slashing 1.5 days of rig time. The operator recognized Baker Hughes in the after-action review, noting that the integrated services delivered “met or exceeded all performance expectations and provided a flawless execution.”

Challenges

- Drilled entire section in one run
- Mitigate salt-exit hazards
- Maintain planned wellbore path
- Reduce dogleg severity while drilling through salt
- Minimize NPT and damage to downhole tools

Results

- Drilled 8,030 ft in 87.7 hours
- Increased ROP by more than 100%
- Drilled and exited salt in one run before kicking off
- Avoided tool failures
- Achieved zero NPT
- Monitored pore pressure to predict casing depth
- Integrated all office and field activities seamlessly